

Public Health Assessment

Franklin Burn Site

CERCLIS No. NJD986570992

Franklin Township, Gloucester County, New Jersey

Public Comment Draft
March 19, 2001

Prepared by:
Hazardous Site Health Evaluation Program
Consumer and Environmental Health Services
Division of Epidemiology, Environmental and Occupational Health
New Jersey Department of Health and Senior Services

Under Cooperative Agreement with:
Agency for Toxic Substances and Disease Registry

Table of Contents

Summary	1
Purpose and Health Issues	2
Background	2
Site Description and History	2
Soil Removal Activities	3
Previous ATSDR/NJDHSS Activity	3
Demography and Land Use	5
Site Visit	6
Discussion	6
Environmental Contamination	6
Pathways Analyses	10
Public Health Implications	10
ATSDR Child Health Initiative	11
Community Health Concerns	11
Conclusions	12
Recommendations	12
Public Health Action Plan	13
Actions Undertaken	13
Actions Planned	13
Documents Reviewed	14
Site Team / Authors	16
Certification	17
Appendices	18
Figure	19
Dioxin and Toxicity Equivalency Factors (TEFs)	21
Glossary	23

Summary

The Franklin Burn site is located in Franklin Township, Gloucester County, New Jersey. The site is actually composed of seven separate parcels of land (denoted as sub-sites 1 to 7). Federal and State investigations of the site indicate that unpermitted copper reclamation activities occurred at the sub-site locations, beginning in the late 1960s. Piles of scrap insulated copper wire, and possibly capacitors and/or transformers were placed on the ground surface and ignited to remove paint and insulation so that the remaining copper could be recovered for sale. The burning operations resulted in the generation of ash piles containing hazardous substances and ranging in area from approximately 480 to 15,000 square feet. The site burning operations are reported to have ceased in 1988. However, some evidence of additional burning was reported in November 1996 on sub-site 5, which is located in the private yard of a residence.

In May 1991, the USEPA conducted an assessment of sub-sites 1 and 2 for their potential inclusion on the National Priorities List (NPL). Maximum concentrations of contaminants detected in soil at Franklin Burn sub-site 1 included copper (176,000 ppm), lead (25,500 ppm), nickel (170 ppm), zinc (142,000 ppm), chromium (106 ppm), polychlorinated biphenyls (PCBs, 106 ppm), and polychlorinated dibenzodioxins/polychlorinated dibenzofurans (dioxins/furans, 0.034 ppm). During the assessment of sub-sites 1 and 2, additional sites, referred to as sub-sites 3, 4, 5, 6 and 7, were discovered.

Residential well sampling data did not indicate the presence of contaminants exceeding ATSDR drinking water health comparison values or New Jersey State primary drinking water standards (maximum contaminant levels). The site was proposed for listing to the NPL in October 1995, and was included on the National Priorities List in June 1996.

This Public Health Assessment evaluates data from the USEPA's remedial investigations and the potential public health issues and human exposure pathways associated with the site. Analysis of site data and information, direct site observation, and community concerns have indicated that a completed human exposure pathway to on-site soils and ash existed prior to remediation at sub-site 5 only. Contaminants of concern at this location included dioxins/furans and heavy metals. Because of the limited accessibility to other sub-site locations, completed exposure pathways to on-site soils and ash probably did not exist.

Based upon the information reviewed, the Franklin Burn site is evaluated by the ATSDR and the NJDHSS to have represented a public health hazard in the past. This health hazard is based only on exposure to site-related contaminants at sub-site 5. While other sub-sites exhibited similar soil contamination levels, it is not probable that these sub-sites were frequented to the degree necessary to result in a significant exposure dose for adults or children. Subsequent to interim remedial measures conducted by the USEPA, the site is considered by the ATSDR and the NJDHSS to present no public health hazard at present, because the soil exposure pathway has been interrupted.

Purpose and Health Issues

This Public Health Assessment serves to evaluate the public health issues associated with the Franklin Burn site, which has been included on the National Priorities List (NPL). NPL or "Superfund" sites represent those sites which are associated with significant public health concern in terms of the nature and magnitude of contamination present, and the potential to adversely impact the health of populations in their vicinity.

This document comprehensively evaluates human exposure pathways associated with known contaminated environmental media within or related to the Franklin Burn site(s) and recommends action consistent with protection of the public health.

At the site, the known contaminated media are on-site soils and groundwater. For residents living near the Franklin Burn site(s), the exposure pathways being considered are chronic ingestion and/or inhalation of contaminated soil and dust, and ingestion of water from contaminated domestic potable wells.

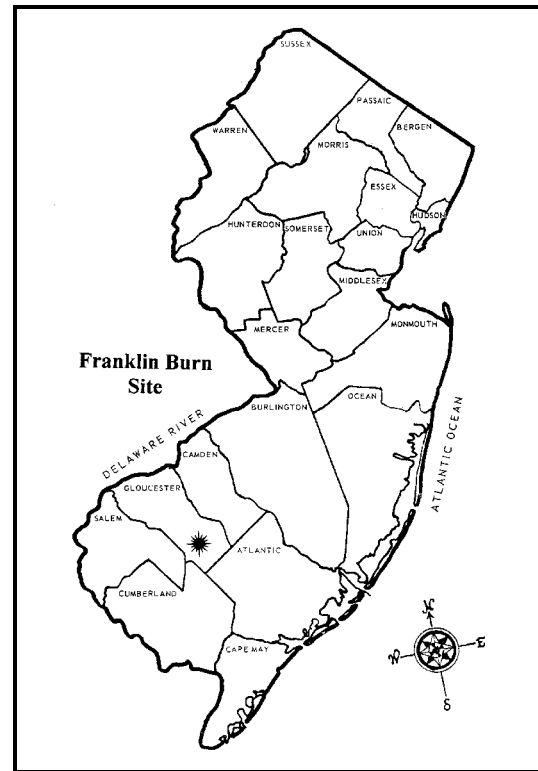
Background

Site Description and History

The Franklin Burn site is located in Franklin Township, Gloucester County, New Jersey (see inset). The site is actually composed of seven separate parcels of land (denoted as sub-sites 1 to 7; see Figure 1 in the Appendix).

Of the seven sub-sites, five are located in proximity to each other along a portion of the Hayes Branch (sub-sites 1, 3, 4, 5 and 6), north of Marshall Mill Road. Sub-site 2 is located approximately 2.5 miles to the north, east of Lincoln Avenue. Sub-site 7 is located approximately 1 mile to the northeast of the clustered sub-sites (1, 3, 4, 5, and 6), and 2,000 feet northwest of Marshall Mill Road. Sub-site 5 is located in the private yard of a residence.

Federal and State investigations of the site(s) indicate that unpermitted copper reclamation activities occurred at the sub-site locations, beginning in the late 1960s. Piles of scrap insulated copper wire and possibly capacitors and/or transformers were



placed on the ground surface and ignited to remove paint and insulation so that the remaining copper could be recovered for sale. The burning operations resulted in the generation of ash piles containing hazardous substances and ranging in area from approximately 480 to 15,000 square feet. All of the ash piles were created through similar activities and contain similar hazardous substances. The site burning operations are reported to have ceased in 1988. However, some evidence of additional burning was reported in November 1996 on sub-site 5.

In 1986, the New Jersey Department of Environmental Protection (NJDEP) investigated sub-sites 1 and 2 and detected heavy metals in the soils, including cadmium (197 parts per million or ppm), chromium (121 ppm), copper (63,700 ppm), lead (13,700 ppm), nickel (131 ppm), and zinc (924,800 ppm).

In February 1989, the NJDEP requested the United States Environmental Protection Agency (USEPA) to assume the lead role in the assessment and remediation of sub-sites 1 and 2. The USEPA completed a remedial investigation/feasibility study in February 1994. The site was proposed for listing to the National Priorities List in October 1995, and was included on the list in June 1996.

Soil Removal Activities

In 1993, the USEPA initiated removal activities at sub-sites 1, 2, and 3 which included the excavation of contaminated soil and on-site stockpiling of contaminated soil and ash. In addition, a temporary "cap" was constructed and drainage controls were implemented, as necessary. In 1997, USEPA removed the consolidated soil/ash piles on sub-sites 1, 2, and 3, and excavated additional soils at sub-site 2 to remove an area of elevated polychlorinated biphenyl (PCB) contamination.

Also in 1993, the ash and contaminated soil at sub-sites 4, 5, 6, and 7 were excavated and transported to an off-site facility for stabilization and disposal. Post-excavation soil sampling was conducted to verify that the soil excavation activities were effective in removing the hazardous substances, and excavated areas were filled with clean soil.

In summary, as of June 1997, all contaminated soil and ash had been removed from all seven sub-sites, and excavated areas had been backfilled with clean fill.

Previous ATSDR/NJDHSS Activity

In September 1991, the USEPA requested the ATSDR to comment on appropriateness of proceeding with the removal action at Franklin Burn sub-sites 3, 4, and 5. Sub-site 5 was located in the yard of a private residence. Migration of ash had discolored soil in the front yard and driveway. Children were observed playing on the ash area during a site visit by the USEPA.

Based on site conditions at that time, the October 1991 ATSDR health consultation concluded that the concentration of metals detected at the Franklin Burn sub-sites 3, 4, and 5 were at levels that may pose a threat to the public health and remedial measures would be justified. The human exposure pathway of concern identified in the report was the ingestion of contaminated soils (and dusts) by children playing near the ash piles. The report also concluded that children are sensitive to neurological effects resulting from lead exposure. Soil concentrations of 500 - 1000 ppm can begin to effect blood lead levels of children residing in these areas. The concentrations of chromium, antimony and zinc were at levels that would result in doses above the USEPA chronic reference doses for these metals, based on a 10 kg child ingesting 200 mg of soil per day.

In November 1992, the USEPA requested the ATSDR to review results of dust samples acquired from inside a residence on site. The USEPA was planning to remove soil at the site and wanted to know if the contamination inside the house would pose a health threat of sufficient magnitude to warrant inclusion in the remediation effort. Two adults and five young children lived in the house. Dust samples were collected from the carpeting, rugs, a couch, and the linoleum floor in the kitchen using a HEPA vacuum. The dust was analyzed for heavy metals. The analyses of dust sample indicated presence of heavy metals including lead (540 ppm), barium (210 ppm), arsenic (17 ppm), copper (1,500 ppm), chromium (40 ppm), nickel (45 ppm), antimony (17 ppm) and zinc (720 ppm). Based on the level of contaminants detected, the November 1992 ATSDR health consultation concluded that lead was the only contaminant found at levels that would represent a health threat. The concern would be for the children living in the house who may ingest lead- contaminated dust. Children are at an increased risk since their developing nervous systems are more vulnerable to lead's toxic effects. The consultation recommended that after completing the remediation of the contaminated soil, the inside of the house should be thoroughly cleaned to limit recontamination. The family residing in the house was temporarily relocated during the removal action.

The New Jersey Department of Health and Senior Services (NJDHSS), under a cooperative agreement with ATSDR, completed a health consultation for the site in February 1997. The health consultation noted that contaminated soils and groundwater were the only identifiable potential environmental pathways associated with the site. The following conclusions were made by the NJDHSS and ATSDR:

1. The ATSDR and the NJDHSS considered the Franklin Burn site(s) to have represented a public health hazard in the past. Adults and children were likely exposed to lead in soils at sub-site 5 at levels of public health concern. The range of blood lead levels detected in children residing at sub-site 5 did not demonstrate exposure at a level of public health significance. While other sub-sites exhibited similar contamination levels, it is not probable that these sub-sites were frequented to the degree necessary to comprise a significant exposure dose for adults or children;
2. In addition, past exposures to dioxin were evaluated. Reported results of the organic analyses concluded that dioxins/furans were present at sub-site 5 at 0.0016 ppm (expressed as 2,3,7,8-

tetrachlorodibenzo-p-dioxin [TCDD] toxicity equivalents [TEQ], please see Appendix for definition). The estimated exposure doses calculated for residents (adults) were of the same order of magnitude as the chronic oral Minimal Risk Level (MRL) of 0.000000001 (1×10^{-9}) mg/kg/day. The estimated exposure doses for children, however, slightly exceeded this MRL. Calculated exposure doses did not exceed the no observed adverse effect levels (NOAELs) for chronic exposure in animals (for effects other than cancer). Based on the information presented in the ATSDR Toxicological Profile for Dioxin, calculated worst-case exposure doses gave an estimated human cancer risk level representing an insignificant or no increased risk of cancer in adults and children. It was concluded by the ATSDR and the NJDHSS that it was highly unlikely that children who played on the site would suffer any adverse health effects from their exposure to dioxin/furans;

3. Subsequent to interim remedial measures conducted by the USEPA, the site was evaluated by the ATSDR and the NJDHSS to present no apparent public health hazard. The soil pathway had been interrupted since ash and contaminated soil had been excavated and transported to an off-site facility for stabilization and disposal;
4. The ATSDR and the NJDHSS determined that current human exposures were occurring through the ingestion pathway (domestic potable wells), in the vicinity of the Franklin Burn sub-sites 1, 2, 3, and 4. However, the detected concentrations of the inorganic contaminants were below ATSDR drinking water comparison values, and also below New Jersey State's primary drinking water standards (maximum contaminant levels);
5. The ATSDR and NJDHSS did not identify any additional community health concerns associated with site related contamination.

The ATSDR and the NJDHSS recommended that monitoring of the domestic potable wells continue to evaluate trends in contaminant concentrations and distributions.

Demography and Land Use

Sub-sites 1 through 7 are located in rural areas and are comprised of residential yards and open fields. Statistics on the population within one mile of sub-sites 1, 2, 3, 4, 5 and 6, based on the 1990 U.S. Census, were calculated by ATSDR using an area-proportion spatial analysis technique, and are presented in Table I.

Only sub-site 5 is located in the private yard of a residence. Areas surrounding the other sub-sites are sparsely populated. The location of residences around these sub-sites varies in distance from 100 to 200 feet.

Table I - Population Within One Mile of Franklin Burn Sub-sites 1,2,3,4,5 and 6.

Total Number of People	2,306
Children aged 6 and younger	269
Adults aged 60 and older	585
Females aged 15 - 45	151
White	2,045
Black	230
American Indian, Eskimo, Aleut	1
Asian or Pacific Islander	6
Other	24
Hispanic Origin	52
Total Housing Units	755

Site Visit

On January 12, 1999, James Pasqualo and Narendra P. Singh of the New Jersey Department of Health and Senior Services (NJDHSS) visited the Franklin Burn sites accompanied by the USEPA Remedial Project Manager. Conditions at the Franklin Burn sub-sites, since the 1997 ATSDR/NJDHSS Health Consultation, have changed physically. Removal activities at sub-sites 1, 2, and 3 have been completed. All ash and contaminated soil have been excavated and transported to an off-site facility for stabilization and disposal. The sub-sites 1, 2, and 3 are fenced and there is limited accessibility to sub-sites 4 and 7. At sub-sites 4 and 7, all contaminated soil and ash has been excavated and transported to an off-site facility for stabilization and disposal. At sub-sites 5 and 6, all contaminated soil above the water table has been excavated and transported to an off-site facility for stabilization and disposal. At sub-sites 4, 5, 6, and 7, excavated areas have been backfilled with clean soil. Sub-site 5 currently contains an occupied single family residence.

Discussion

Environmental Contamination

Soil Contamination

From 1989 to 1994, USEPA conducted extensive soil sampling to delineate the extent of contamination at each of seven sub-sites. The maximum reported concentrations of contaminants in on-site soil samples at individual sub-sites prior to removal of contaminated soils are presented below in Table II.

Table II - Maximum concentrations of contaminants in on-site soil samples prior to removal

(all values are in parts per million or ppm).

Contaminant	sub-site 1	sub-site 2	sub-site 3	sub-site 4	sub-site 5	sub-site 6	sub-site 7	Comparison Value
Copper	176,000	20,000	107,732	732	113,683	84,198	190,000	n.a.
Lead	25,500	13,700	34,289	846	41,883	24,225	12,000	n.a.
Chromium	106	35.5	20	n.d.	n.d.	n.d.	1,212	200 ppm-child(RMEG)
Manganese	211	529	122	490	390	40	n.d.	3000 ppm-child(RMEG)
Antimony	806	37.4	10,777	256	11,265	2,670	n.d.	20 ppm-child(RMEG)
Nickel	170	43.9	53.7	n.d.	n.d.	n.d.	n.d.	1000 ppm-child(RMEG)
Zinc	142,000	24,800	27,970	258,114	70,874	23,535	12,000	20000 ppm-child(EMEG)
Dioxins/Furans (expressed as 2,3,7,8-TCDD toxicity equivalents)	0.034	.0029	0.0192	n.d.	0.0016	n.d.	n.d.	0.00005 TEQs
PCB	0.106	4.417	0.53	n.d.	n.d.	n.d.	n.d.	0.4 ppm (CREG)

n.d.=not detected, n.a.=not available, RMEG=Reference Dose Media Evaluation Guide, EMEG=Environmental Media Evaluation Guide

CREG=Cancer Risk Evaluation Guide

Maximum concentrations of contaminants detected in soil at Franklin Burn (sub-site 1 through 7) included copper (190,000 ppm), lead (41,883 ppm), chromium (1,212 ppm), manganese (529 ppm), antimony (11,265 ppm), nickel (170 ppm), zinc (258,114 ppm), dioxins/furans (0.034 ppm - 2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD] toxicity equivalents [TEQ]) , and PCBs (4.417 ppm).

Groundwater Contamination

The Kirkwood-Cohansey aquifer system is the predominant water table aquifer that underlies the region. At sub-sites 1 and 3, groundwater appears to be moving northwest towards Hayes Branch and at sub-sites 5 and 6, groundwater appears to be moving north-northwest towards Hayes Branch. Most of the residences in the area of sub-sites 1, 2, 3, 4 and 5 have private potable wells.

Monitoring Wells: 1992 and 1995 Sampling

In September 1992, the USEPA conducted groundwater investigations by installing and sampling water from temporary monitoring wells at each of the seven sub-sites. In 1995, groundwater samples were collected from the ten monitoring wells at sub-sites 1, 3, 5, 6 and 7. The groundwater samples were analyzed for volatile organics, semi-volatile organics, PCBs/pesticides, metals, dioxins and furans. Method Detection Limits (MDL) for dioxin and furan congeners needed to be in the **picogram per liter (pg/L), or parts per quadrillion (ppq) range**. The maximum reported concentrations of inorganic contaminants detected in 1992 included aluminum (93,000 ppb), barium (340 ppb), chromium (180 ppb), copper (980 ppb), zinc (230 ppb), manganese (298 ppb) and lead (110 ppb). In addition, analysis of samples collected in 1995 indicated an estimated maximum concentration of total 2,3,7,8-TCDD TEQ of 0.945J (estimated value) ppq. Maximum reported concentrations of contaminants detected in monitoring well groundwater samples at sub-sites 1-7 are presented below in Table III.

Table III - Maximum concentrations of contaminants in monitoring well samples (all values are in parts per billion or ppb except dioxins/furans in parts per quadrillion or ppq).

Contaminant	sub-site 1	sub-site 2	sub-site 3	sub-site 4	sub-site 5	sub-site 6	sub-site 7	Comparison Value
Aluminum	28,000	56,000	93,000	8,600	1,900	4,800	36,000	20000 ppb-child(EMEG)
Barium	62	340	73	58	130	98	110	700 ppb-child (RMEG)
Chromium	28	51	7	24	n.d.	10	180	100 ppb (MCL)
Copper	66	n.d.	38	n.d.	16	n.d.	980	1,300 ppb (Action Level)
Zinc	57	28	72	13	14	n.d.	230	3000 ppb-child (EMEG)
Manganese	298	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	500 ppb-child (RMEG)
Lead	16	8	33	n.d.	n.d.	n.d.	110	0 (MCLG), 15 ppb (Action Level)
PCB	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.5 (MCL)
Dioxins/Furans (expressed as 2,3,7,8-TCDD toxicity equivalents)	0.119 J ppq	n.d.	0.140 J ppq	n.d.	0.041 J ppq	0.945 J ppq	0.089 J ppq	10 ppq-child (EMEG) 40ppq-adult (EMEG)

n.d.=not detected, n.a.=not available, RMEG=Reference Dose Media Evaluation Guide, EMEG=Environmental Media Evaluation Guide
MCL= Maximum Contaminant Level, MCLG= Maximum contaminant level goal, J= Estimated Value

Residential Wells: 1991 and 1995 Sampling

Most of the residences in the area of sub-sites 1, 2, 3, 4 and 5 have private potable wells. In May 1991, the USEPA conducted groundwater investigations in the vicinity of the seven sub-sites. During this investigation no residences could be located in the vicinity of sub-sites 6 and 7. Maximum reported concentrations of contaminants in residential wells water samples are presented below in

Table IV.

Table IV - Maximum concentrations of contaminants in residential water samples (all values are in parts per billion or ppb except dioxins/furans in parts per quadrillion or ppq).).

Contaminants	Sub-site 1, 3, and 4	sub-site 2	sub-site 5	Comparison Value
Aluminum	48.9 J	289	n.d.	20000 ppb-child (EMEG)
Barium	43 J	n.d.	n.d.	700 ppb-child (RMEG)
Chromium	n.d.	n.d.	n.d.	100 ppb MCL
Copper	145	876	n.d.	1,300 ppb (Action Level)
Zinc	1,940	1,940 J	n.d.	3000 ppb-child (EMEG)
Manganese	1,250	91.2	n.d.	500 ppb-child (RMEG)
Lead	5.8	7.9	n.d.	0 (MCLG), 15 ppb (Action Level)
Dioxins/Furans (expressed as 2,3,7,8- TCDD toxicity equivalents)	n.d.	n.d.	n.d.	10 ppq-child (EMEG) 40ppq-adult (EMEG)

n.d.=not detected, n.a.=not available, RMEG=Reference Dose Media Evaluation Guide, EMEG=Environmental Media Evaluation Guide
MCL= Maximum Contaminant Level, MCLG= Maximum contaminant level goal, J= Estimated Value

The maximum reported concentrations of inorganic contaminants at sub-sites 1-5 included aluminum (289 ppb), copper (876 ppb), zinc (1,940 ppb estimated value), manganese (1,250 ppb), and lead (7.9 ppb). In 1995, additional samples were collected from six domestic potable wells in the vicinity of sub-site 2. The maximum reported concentrations of inorganic contaminants included aluminum (289 ppb), and lead (5 ppb). No organic compounds were detected.

Residential well sampling data did not indicate the presence of contaminants exceeding ATSDR drinking water comparison values or New Jersey primary drinking water standards (maximum contaminant levels). New Jersey secondary drinking water standards, which are primarily based on aesthetic criteria, were exceeded for manganese. Lead concentrations exceeded the proposed maximum contaminant level goal (MCLG) of 0, but not the 15 ppb action level set by USEPA. The action level is not a maximum contaminant level (MCL), but it is a trigger point at which remedial action is to take place.

Pathways Analyses

A completed human exposure pathway consists of five elements: (1) a source of contamination; (2) transport through an environmental medium; (3) a point of human exposure; (4) route of human exposure; and (5) an exposed population. NJDHSS/ATSDR classifies exposure pathways into three groups: "completed pathways," that is, those in which exposure has occurred, is occurring, or will occur; "potential pathways," that is, those in which exposure might have

occurred, may be occurring, or may yet occur; and "eliminated pathways," that is, those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified.

Completed Exposure Pathway

The human exposure pathway of concern as identified in previous ATSDR Health Consultations was the ingestion of contaminated soils and dusts by children playing near the ash piles at sub-site 5. Sub-site 5 is located in the yard of a private residence, and posed a direct threat to residents, especially children, living at or near the site. The residence at sub-site 5 is occupied by a family of 7 people, including 5 children. The potential for exposure existed from around 1970 until 1992 when the soil removal operation began. Presently, all contaminated soils above the water table have been excavated and the yard has been backfilled with clean soil, thus eliminating the source of contamination and interrupting the pathway for current and future exposure.

While other sub-sites exhibited similar contamination levels, it is not probable that these sub-sites were frequented to the degree necessary to comprise a significant exposure dose for adults or children.

Public Health Implications

Toxicological Evaluation

This section contains discussion of possible health effects in persons exposed to specific contaminants (for completed pathways) and discusses health outcome data. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are more likely to have associated illnesses or disease.

A human exposure pathway associated with the ingestion of contaminated soils and dusts by children playing near the ash piles at sub-site 5 was evaluated in the previous NJDHSS/ATSDR Health Consultation.

The previous NJDHSS/ATSDR Health Consultation (1997) evaluated the public health significance of lead and dioxins/furans levels in the soils at the sub-site 5. The Health Consultation concluded that lead levels constituted a public health hazard for children, while dioxins/furans did not. However, the exposure pathway at sub-site 5 has been interrupted by remedial actions of the USEPA. Therefore there are no remaining public health concerns regarding the soils at sub-site 5.

Under current site conditions and based upon available information, presently there are no

completed exposure pathways associated with any sub-site(s) which merit toxicological evaluation.

Health Outcome Data

In April 1992, the Gloucester County Health Department tested 5 children for blood lead levels who were living at sub-site 5. Lead levels detected in their blood were not indicative of significant lead exposure, and were not at levels expected to cause adverse health effects.

ATSDR Child Health Initiative

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination in their environment. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from waste sites. They are more likely exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, which means they breathe dust, soil, and heavy vapors closer to the ground. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

The NJDHSS and the ATSDR have evaluated the likelihood for children living near sub-site 5 to be exposed to contaminants at levels of public health concern. Site data and information do suggest the presence of a completed exposure pathway in the past, for the ingestion or inhalation of on-site soils, for sub-site 5. However, lead levels detected in the blood of children residing on the site were not indicative of significant lead exposure, and were not at the levels expected to cause adverse health effects.

Community Health Concerns

Residents had expressed concerns regarding potential health effects associated with exposure to site-related contaminants, especially for children living adjacent to sub-site 5 who used the area for recreational purposes. The removal actions taken by the USEPA have isolated site contaminants and precluded any current exposure potential to soil contamination. Past exposure to dioxins/furans in soils at sub-site 5 was evaluated. Based on calculated worst-case exposure doses, there was an insignificant or no increased risk of cancer in adults and children. It is highly unlikely that children who played on the site would suffer any adverse health effects from their exposure to dioxin/furans. In addition, current private potable well data does not indicate that site-related contaminants are present at levels of public health significance. The ATSDR/NJDHSS have not identified any additional community health concerns associated with the Franklin Burn site.

Conclusions

On the basis of the information reviewed, ATSDR and NJDHSS have concluded that the Franklin Burn site in its present state poses no public health hazard. The soil pathway has been interrupted subsequent to remedial measures conducted by the USEPA, and levels of site-related contaminants in drinking water are below levels of health concern.

The ATSDR and the NJDHSS consider the Franklin Burn site(s) to have represented a public health hazard in the past, due to a completed exposure pathway in the past through ingestion or inhalation of on-site soils at sub-site 5. Based upon the exposure, adults and children were likely to have been exposed to lead in soils at sub-site 5 at levels of public health concern. However, blood lead measured in children, residing at sub-site 5 in 1992, was not at a level of public health significance.

In addition, past exposure to dioxins/furans in soils at sub-site 5 was evaluated. Based on calculated worst-case exposure doses, there was an insignificant or no increased risk of cancer in adults and children. It is highly unlikely that children who played on the site would suffer any adverse health effects from their exposure to dioxin/furans.

Recommendations

Results of periodic environmental monitoring for groundwater quality should be reviewed for public health significance when available. New environmental, toxicological, health outcome data, or other changes in conditions at the site may determine the need for other additional actions by the ATSDR and the NJDHSS at these sites.

Public Health Action Plan

The Public Health Action Plan (PHAP) for the Franklin Burn site contains a description of the actions to be taken at or in the vicinity of the site. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. This report will be placed in repositories that contain copies of this public health assessment, and will be provided to persons who request it. The public health actions taken or to be implemented are as follows:

Actions Undertaken:

1. Available data and information have been evaluated by the ATSDR and the NJDHSS to determine public health concerns regarding potential human exposure pathways associated with the site.
2. A physician newsletter, *Health and Hazardous Waste (A Practitioner's Guide to Patients' Environmental Exposures)*, prepared by the Consumer and Environmental Health Services (CEHS), has been sent to 158 Gloucester County physicians.
3. Physician education, in the form of appropriate Case Studies in Environmental Medicine and Gloucester County Environmental Resource Guides for Health Care Professionals, were provided to area physicians.

Actions Planned by ATSDR/NJDHSS:

1. The NJDHSS is assessing the need for additional outreach to the community regarding the Franklin Burn site. If necessary, an availability session will be conducted to document and address community concerns.
2. The NJDHSS is preparing a site-specific citizens guide for the Franklin Burn site.
3. The ATSDR and the NJDHSS will re-evaluate and expand the Public Health Action Plan (PHAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at the site.

Documents Reviewed

1. Draft Remedial Investigation Report, Volume I, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., August 1997.
2. Draft Remedial Investigation Report, Volume II, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., August 1997.
3. Draft Remedial Investigation Report, Volume III, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., August 1997.
4. Draft Remedial Investigation Report, Volume IV, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., August 1997.
5. ATSDR/NJDHSS Health Consultation Report, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. NJDHSS/ATSDR, February 1997.
6. Superfund Accelerated Cleanup Model Remedial Investigation/Feasibility Study Draft Final Work Plan, Volume I, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., February 1994.
7. Superfund Accelerated Cleanup Model Remedial Investigation/Feasibility Study Draft Final Field Sampling Plan, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., February 1994.
8. Supplemental Extent Of Contamination In Soil And Preliminary Groundwater Assessment, Final Report, Franklin Burn Site, Franklin Township, Gloucester County, New Jersey. Roy F. Weston Inc., February 1993.
9. ATSDR Health Consultation Report, Franklin Burn Site (sub-site 5), Franklin Township, Gloucester County, New Jersey. ATSDR, November 1992.
10. ATSDR Health Consultation Report, Franklin Burn Site (sub-site 3, 4, and 5), Franklin Township, Gloucester County, New Jersey. ATSDR, October 1991.
11. ATSDR Toxicological Profile for Lead. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. February 1998.
12. ATSDR Toxicological Profile for Dioxin. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. June 1989.

Interviews/Personal Communications:

1. Site Remediation Program, USEPA/Site Manager.
2. Gloucester County Health Department/Senior Environmental Specialist.

Site Team / Authors

Preparer of Report:

Narendra P. Singh, M.D., M.S., C.I.H.
Research Scientist II
Health Assessment Project

ATSDR Regional Representative:

Arthur Block
Senior Regional Representative; Region II
Regional Operations
Office of the Assistant Administrator

ATSDR Technical Project Officer:

Gregory V. Ulirsch, M.S.
Environmental Health Engineer
Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation

Any questions concerning this document should be directed to:

James Pasqualo, M.S.
Health Assessment Project Manager
Consumer and Environmental Health Services
Division of Epidemiology, Environmental and Occupational Health
New Jersey Department of Health and Senior Services
210 South Broad Street
P.O. Box 360
Trenton, NJ 08625-0360

Certification

This Public Health Assessment was prepared by the New Jersey Department of Health and Senior Services (NJDHSS) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Public Health Assessment was begun.

Gregory V. Ulirsch
Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

Richard Gillig
Chief, SSAB, DHAC, ATSDR

Appendices

Figure

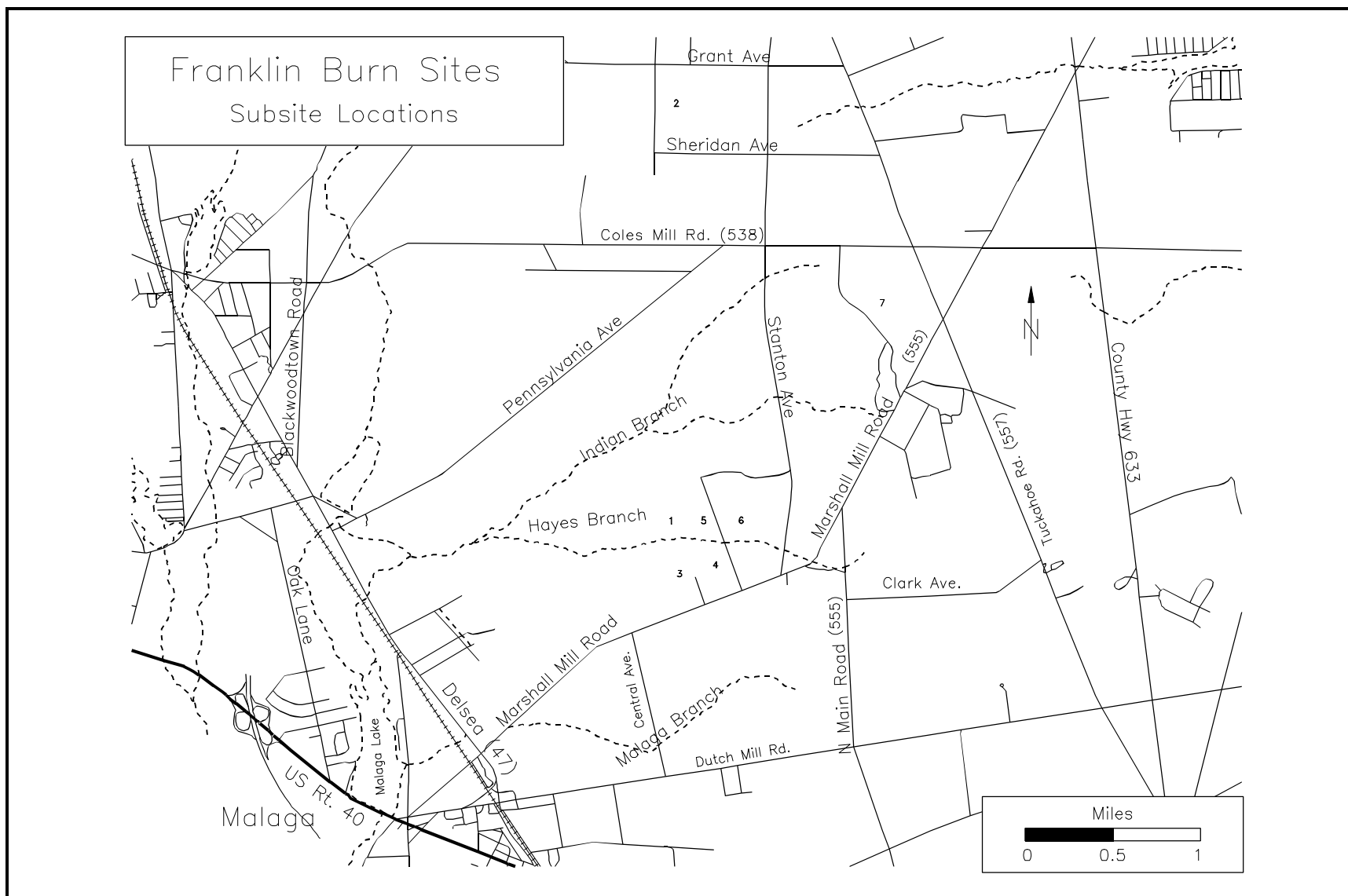


Figure 1 - Franklin Burn; Sub-site Locations

Dioxin and Toxicity Equivalency Factors (TEFs)

Dioxin and dioxin-like compounds

Dioxin and dioxin-like compounds are structurally related groups of chemicals from the family of halogenated aromatic hydrocarbons. Depending on the number of chlorine-substituted positions, there are several congeners in each group. The most toxic and the most studied congener is 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-TCDD.

Toxicity equivalency factors (TEFs) were developed to compare the relative toxicity of individual dioxin-like compounds to that of TCDD. This comparison is based on the assumption that dioxin and dioxin-like compounds act through the same mechanism of action and the assumption that receptor-mediated toxicity of dioxin-like chemicals is additive.

The TEF for TCDD is defined as one, whereas TEF values for all other dioxin-like compounds are less than one. Toxicity equivalents (TEQs) are used to assess the risk of exposure to a mixture of dioxin-like compounds.

A TEQ is defined as the product of the concentration, C_i , of an individual "dioxin-like compound" in a complex environmental mixture and the corresponding TCDD toxicity equivalency factor (TEF_i) for that compound. The total TEQs is the sum of the TEQs for each of the congeners in a given mixture:

$$\text{Total TEQs} = \sum_{i=1}^n (C_i \times TEF_i)$$

Glossary

ATSDR Plain Language Glossary of Environmental Health Terms

Absorption:	How a chemical enters a person's blood after the chemical has been swallowed, has come into contact with the skin, or has been breathed in.
Acute Exposure:	Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.
Additive Effect:	A response to a chemical mixture, or combination of substances, that might be expected if the known effects of individual chemicals, seen at specific doses, were added together.
Adverse Health Effect:	A change in body function or the structures of cells that can lead to disease or health problems.
Antagonistic Effect:	A response to a mixture of chemicals or combination of substances that is less than might be expected if the known effects of individual chemicals, seen at specific doses, were added together.
ATSDR:	The Agency for Toxic Substances and Disease Registry. ATSDR is a federal health agency in Atlanta, Georgia that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals.
Background Level:	An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific-environment.
Biota:	Used in public health, things that humans would eat – including animals, fish and plants.
CAP:	See Community Assistance Panel.
Cancer:	A group of diseases which occur when cells in the body become abnormal and grow, or multiply, out of control
Carcinogen:	Any substance shown to cause tumors or cancer in experimental studies.

CERCLA: See Comprehensive Environmental Response, Compensation, and Liability Act.

Chronic Exposure: A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be *chronic*.

Completed Exposure

Pathway: See Exposure Pathway.

Community Assistance

Panel (CAP): A group of people from the community and health and environmental agencies who work together on issues and problems at hazardous waste sites.

Comparison Value:

(CVs) Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated.

Comprehensive Environmental Response, Compensation, and Liability

Act (CERCLA):

CERCLA was put into place in 1980. It is also known as **Superfund**. This act concerns releases of hazardous substances into the environment, and the cleanup of these substances and hazardous waste sites. ATSDR was created by this act and is responsible for looking into the health issues related to hazardous waste sites.

Concern: A belief or worry that chemicals in the environment might cause harm to people.

Concentration: How much or the amount of a substance present in a certain amount of soil, water, air, or food.

Contaminant: See Environmental Contaminant.

Delayed Health

Effect: A disease or injury that happens as a result of exposures that may have occurred far in the past.

Dermal Contact: A chemical getting onto your skin. (see **Route of Exposure**).

Dose:	The amount of a substance to which a person may be exposed, usually on a daily basis. Dose is often explained as “amount of substance(s) per body weight per day”.
Dose / Response:	The relationship between the amount of exposure (dose) and the change in body function or health that result.
Duration:	The amount of time (days, months, years) that a person is exposed to a chemical.
Environmental Contaminant:	A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than that found in Background Level , or what would be expected.
Environmental Media:	Usually refers to the air, water, and soil in which chemical of interest are found. Sometimes refers to the plants and animals that are eaten by humans. Environmental Media is the second part of an Exposure Pathway .
U.S. Environmental Protection Agency (EPA):	
	The federal agency that develops and enforces environmental laws to protect the environment and the public’s health.
Epidemiology:	The study of the different factors that determine how often, in how many people, and in which people will disease occur.
Exposure:	Coming into contact with a chemical substance.(For the three ways people can come in contact with substances, see Route of Exposure .)
Exposure Assessment:	The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.
Exposure Pathway:	A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

1. Source of Contamination,
2. Environmental Media and Transport Mechanism,
3. Point of Exposure,
4. Route of Exposure; and,

5. Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in this Glossary.

Frequency:	How often a person is exposed to a chemical over time; for example, every day, once a week, twice a month.
Hazardous Waste:	Substances that have been released or thrown away into the environment and, under certain conditions, could be harmful to people who come into contact with them.
Health Effect:	ATSDR deals only with Adverse Health Effects (see definition in this Glossary).
Indeterminate Public Health Hazard:	The category is used in Public Health Assessment documents for sites where important information is lacking (missing or has not yet been gathered) about site-related chemical exposures.
Ingestion:	Swallowing something, as in eating or drinking. It is a way a chemical can enter your body (See Route of Exposure).
Inhalation:	Breathing. It is a way a chemical can enter your body (See Route of Exposure).
LOAEL:	Lowest Observed Adverse Effect Level. The lowest dose of a chemical in a study, or group of studies, that has caused harmful health effects in people or animals.
Malignancy:	See Cancer .
MRL:	Minimal Risk Level. An estimate of daily human exposure – by a specified route and length of time -- to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.
NPL:	The National Priorities List . (Which is part of Superfund .) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site needs to be cleaned up or is being looked at to see if people can be exposed to chemicals from the site.
NOAEL:	No Observed Adverse Effect Level. The highest dose of a chemical in a study, or group

of studies, that did not cause harmful health effects in people or animals.

No Apparent Public

Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals may have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.

No Public

Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.

PHA: **Public Health Assessment.** A report or document that looks at chemicals at a hazardous waste site and tells if people could be harmed from coming into contact with those chemicals. The PHA also tells if possible further public health actions are needed.

Plume: A line or column of air or water containing chemicals moving from the source to areas further away. A plume can be a column or clouds of smoke from a chimney or contaminated underground water sources or contaminated surface water (such as lakes, ponds and streams).

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For examples:
the area of a playground that has contaminated dirt, a contaminated spring used for drinking water, the location where fruits or vegetables are grown in contaminated soil, or the backyard area where someone might breathe contaminated air.

Population: A group of people living in a certain area; or the number of people in a certain area.

PRP: **Potentially Responsible Party.** A company, government or person that is responsible for causing the pollution at a hazardous waste site. PRP's are expected to help pay for the clean up of a site.

Public Health

Assessment(s): See **PHA**.

Public Health

Hazard: The category is used in PHAs for sites that have certain physical features or evidence of chronic, site-related chemical exposure that could result in adverse health effects.

Public Health

Hazard Criteria: PHA categories given to a site which tell whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:

1. Urgent Public Health Hazard
2. Public Health Hazard
3. Indeterminate Public Health Hazard
4. No Apparent Public Health Hazard
5. No Public Health Hazard

Receptor

Population: People who live or work in the path of one or more chemicals, and who could come into contact with them (See **Exposure Pathway**).

Reference Dose

(RfD): An estimate, with safety factors (see **safety factor**) built in, of the daily, life-time exposure of human populations to a possible hazard that is not likely to cause harm to the person.

Route of Exposure: The way a chemical can get into a person's body. There are three exposure routes:

- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

Safety Factor: Also called **Uncertainty Factor**. When scientists don't have enough information to decide if an exposure will cause harm to people, they use "safety factors" and formulas in place of the information that is not known. These factors and formulas can help determine the amount of a chemical that is not likely to cause harm to people.

SARA: The Superfund Amendments and Reauthorization Act in 1986 amended CERCLA and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from chemical exposures at hazardous waste sites.

Sample Size: The number of people that are needed for a health study.

Sample: A small number of people chosen from a larger population (See **Population**).

Source

(of Contamination): The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an **Exposure Pathway**.

Special

Populations: People who may be more sensitive to chemical exposures because of certain factors such as age, a disease they already have, occupation, sex, or certain behaviors (like cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Statistics: A branch of the math process of collecting, looking at, and summarizing data or information.

Superfund Site: See **NPL**.

Survey: A way to collect information or data from a group of people (**population**). Surveys can be done by phone, mail, or in person. ATSDR cannot do surveys of more than nine people without approval from the U.S. Department of Health and Human Services.

Synergistic effect: A health effect from an exposure to more than one chemical, where one of the chemicals worsens the effect of another chemical. The combined effect of the chemicals acting together are greater than the effects of the chemicals acting by themselves.

Toxic: Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.

Toxicology: The study of the harmful effects of chemicals on humans or animals.

Tumor: Abnormal growth of tissue or cells that have formed a lump or mass.

Uncertainty

Factor: See **Safety Factor**.

Urgent Public

Health Hazard: This category is used in ATSDR's Public Health Assessment documents for sites that have certain physical features or evidence of short-term (less than 1 year), site-related chemical exposure that could result in adverse health effects and require quick intervention to stop people from being exposed.